

Error in measurement

- 💡 When a scale is used correctly, the **maximum possible error** in the measurement is half (0.5) of the measurement unit. Some say (± 0.5)
- 💡 **Percentage error** = $\frac{\text{error}}{\text{original measurement}} = 100\%$
- 💡 **The limits of accuracy (aka the range of values)** are found by adding and subtracting (respectively) the half unit.
- 💡 The smaller the percentage error, the more accurate the measurement.

eg If there is a measurement of 4 cm, the:

- ☀ **Error would be 0.5cm. (This can also be called the greatest possible error or the absolute error;**
- ☀ **Range of values which can also be called limits or limits of accuracy would be between 3.5 and 4.5cm ($4 \pm$ the error)**
- ☀ **3.5 is the minimum value (also known as the least value or lowest limit);**
- ☀ **4.5cm is the maximum value (also known as the highest limit or greatest value)**
- ☀ **The percentage error is $\frac{0.5}{4} \times 100\% = 12.5\%$**

eg For the measurement of 8.5cm:

The error is

The range of values is

The percentage error is

eg For a measurement of 14m:

The error is

The range of values is

The Percentage error is

eg The weight of a loaf of bread is 670g, to the nearest 10 grams. Find the limits of accuracy and the percentage error.

eg An amount in a carton of milk is 300mL, to the nearest 100 mL means the weight lies between what range? Find the percentage error.

eg The height of a person is 65.5cm. Find the lowest limit the person's height can be if the measurement is to the nearest 0.5 cm.

The side length of a cube is 4.3cm. Find the range of values for the:

a) Length of a face;

b) Area of a face;

c) Volume of the cube

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